Selwyn Gomes

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EDUCATION

Birla Institute of Technology and Science (BITS) Pilani — **Goa, India**
B.E.(Hons.), Electronics and Instrumentation Engineering with a Minor in Finance — *July 2015 - June 2019*
CGPA: 8.50/10

WORK EXPERIENCE

The National University of Singapore — **Singapore**
Research Assitant | Advisor: Prof. Jonathan Scarlett — *Jul 2019 - Present*

- Worked on quantized compressive sensing with deep priors.
- In this study, we tested the performance of a pre-trained GAN prior and untrained neural network prior (Deep Decoder) for image recovery using quantized measurements on the mnist and celebA datasets
- Currently, exploring multi-armed bandit problems in a Bayesian setting using Gaussian processes.

Code-GAN Code-DD

The University of Melbourne — **Melbourne,Australia**
Research Assitant | Advisor: Prof. Jonathan Manton and Dr. Michael Pauley — *Jul 2018 - Dec 2018*

- In this work, we implemented different deep learning algorithms to construct a pulse height spectrum with high precision
- The algorithms presented try to extract information from pulses generated by radiation detectors
- We created a simple deep learning model using a combination of recurrent, convolutional and fully connected networks.

Project Report Code

Worldquant LLC — **Mumbai, India**
Research Consultant — *Jan 2017 - Jan 2019*

- Involved in developing trading algorithms called alphas which are mathematical, predictive model of the theoretical performance of financial instruments.
- The trading algorithms are developed on Websim, a web and mobile application where users employ expression-based syntax or Python code.
- The Alphas developed are back-tested by running historical simulation on websim.

RESEARCH PROJECTS

EEG Based Classification of Bilingual Unspoken Speech as a Biometric Measure — *Jan 2018 - Aug 2019*
Advisor:Prof. Veeky Baths, BITS, Pilani, KK Birla Goa Campus

- This project focuses on the use of bilingual imagined speech for user identification.
- The collected data was cleaned and pre-processed using the EEGlab toolbox in Matlab
- Spectral band powers of the alpha,beta and gamma waves was used as suitable features
- The classification was done using a artificial neural network and 2-D convolutional network.

Code

COURSE PROJECTS

32-Bit Pipelined Processor *April 2019 - May 2019*
Course:Computer Architecture

- Designed and implemented a 32-bits pipelined MIPS processor to handle R-type, I-type and J-type instructions.
- Implementation was done in Verilog on ModelSim platform, with hazard detection and forwarding units included for its handling.

Flour Mill Packaging System *Jan 2017 - May 2017*
Course: Microprocessors and Interfacing

- Designed a weight and temperature controlled flour packaging machine using Proteus andcoded in MASM.

Peer-reviewed Publications

- **"Sample Complexity Bounds for 1-bit Compressive Sensing and Binary Stable Embeddings with Generative Priors",** Z. Liu, **S. Gomes**, A. Tiwari, J. Scarlett.
  In *Proceedings of the 37th International Conference on Machine Learning*. **ICML 2020** [Preprint]

KEY SKILLS

- **Languages/Libraries:** Python, Numpy, Verilog, Keras, Tensorflow, PyTorch, C/C++, Pandas, Scikit-learn, SQL, Git
- **Technologies:** Xilinx ISE, Proteus ISIS, MATLAB, Websim, MkDocs, Microsoft, Excel, LaTeX

TEACHING EXPERIENCE

- **Organizer**, The Machine Learning Reading Group
  with Prof. Manton, The University of Melbourne Jul 2018 - Dec 2018
  I was responsible for scheduling the group meetings, allocating the presentation topics, reviewing and revising the material before each gathering and maintaining a updated git repository of all presented documents.

RELEVANT COURSEWORK

- **Electronics:** Microprocessors and Interfacing, Computer Architecture, Probability and Statistics, Introduction to Programming, Digital Design, Signal and Systems.

- **Finance:** Econometric Methods, Mathematics I,II and III, Financial Management, Security Analysis and Portfolio Management, Derivatives and Risk Management

AWARDS AND ACHIEVEMENTS

- **Autumn Alphathon 2016:** I achieved a gold level 3 status and placed in the top 25 out of 200 + participants in the 2016 Autumn Alphathon conducted by Worldquant. I received a stipend of 500 USD.

- **Worldquant Alpha Building Competition:** I participated in the worldquant alpha building competition in 2016 and achieved a gold level. Achieving this level enabled me to receive a contract as a research consultant at Worldquant LLC.